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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/054,042	01/22/2002	Steven R. Kunkel	ROC920010209US1	1375

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EXAMINER

NAMAZI, MEHDI

ART UNIT	PAPER NUMBER
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2188

DATE MAILED: 01/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/054,042

Applicant(s)

KUNKEL ET AL.

Examiner

Mehdi Namazi

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6, 12-17, 19-24 and 29-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 12-17, 19-24 and 29-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____. 6) ☐ Other: _____

DETAILED ACTION

This office action is in response to Amendment filed October 3, 2003
(Amendment A).

Claims 1-28 have been presented for examination. Claims 7-11, 18, and 25-28 have been canceled. New claims 29-38 have been added. Therefore claims 1-6, 12-17, and 19-38 remain pending in the application.

Response to Arguments

1. Applicant's arguments with respect to claims 1-6, 12-17, and 19-24 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 1-6, 12-14, 19-24, and 34 are rejected under 35 U.S.C. 102(e) as being anticipated by Ang (U.S. Pub. No. 2003/0079085).

As per claims 1, 12, and 19, Ang teaches a method of managing cache in a shared memory multiple processor computer system:

Executing, by a processor, a cache purge instruction that configures the processor to purge a cache line from the processor and send the cache line to at least one of a plurality of processors in the shared memory multiple processor computer system to update the at least one of a plurality of processors (page 2, paragraph 25, lines 1-15).

As per claims 2, 13, and 20, Ang teaches the step of executing, by a processor, a cache purge instruction is performed after modifying the cache line by the processor (page 1, paragraph 9, lines 14-16).

As per claims 3, 14, and 21, Ang teaches wherein the cache line has a unique address (it is inherent in any cache system to have an address for each line).

As per claims 4, and 22, Ang teaches wherein the cache purge instruction updates all processors in the computer system (page 1, paragraph 25, lines 3-10).

As per claims 5, and 23, Ang teaches wherein the cache purge instruction updates only an oldest cache line (page 2, paragraph 25, lines 1-6).

As per claims 6, and 24, Ang teaches wherein the cache purge instruction updates at least one level of cache (page 2, paragraph 25, lines 1-7).

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application

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by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

3. Claims 29, and 35 are rejected under 35 U.S.C. 102(e) as being anticipated by Yates et al. (U.S. Patent No. 6,549,959).

As per claims 29, and 35, Yates teaches a method of managing cache in a shared memory multiple processor computer system, comprising:

Executing, by a processor, a cache purge instruction that configures the processor to purge a cache line from the processor and send the cache line to at least one of a plurality of processors in the shared memory multiple processors (col. 31, lines 41-42, data in the cache are current mean that data have been purged and updated), wherein the cache purge instruction updates all caches in the computer system and marks a state of all updated cache line as shared (col. 31, lines 41-49).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ang, and further in view of AAPA.

As per claim 30, Ang teaches a method of managing cache in a shared memory multiple processor computer system, comprising:

Executing, by a processor, a cache purge instruction that configures the processor to purge a cache line from the processor and send the cache line to at least one of a plurality of processors in the shared memory multiple processors, wherein the cache purge instruction updates all caches in the computer system (page 2, paragraph 25, lines 1-16)

As per claim 30 Ang teaches the claimed invention, but fails to teach marking a state of all updated cache line as temporarily invalid. However, AAPA teaches when an entry in the cache is changed or modified, the directory temporary invalidates the respective directory entry corresponding to the cache line (page 8, paragraph 30, lines 6-8).

Therefore, it would have been obvious to one having ordinary skill in the art to modify the work of Ang because AAPA teaches temporarily invalidating a cache line in order to be over written if it is the oldest cache line.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 15-16, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ang, and further in view of Yates.

As per claims 15-16, and 34, Ang teaches a computer system, comprising a shared memory and at least two processors wherein each processor is associated with at least one level of cache and wherein each processor, when executing a cache purge instruction and send the cache line to at least one other processor in the computer system to up date the at least one other processor (page 2, paragraph 25, lines 1-16).

As per claims 15-16, and 34 Ang teaches the claimed invention, but fails to teach the cache purge instruction is referenced to at least five field and one of the at least five field indicates how the state of the updated cache(s) will be marked.

Yates teaches modification to multiprocessor, wherein there are five different modifications during updating data in caches of both processors (col. 30, lines 58-67).

Therefore, it would have been obvious to one having ordinary skill in the art to modify the work of Ang because Yates teaches five different modifications during updating cache in order to show the status of cache for accessing.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 31-33, and 36-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ang, and further in view of Liu (US 5,210,848).

As per claims 31, and 36, Ang teaches a method of managing cache in a shared memory multiple processor computer system:

Executing, by a processor, a cache purge instruction that configures the processor to purge a cache line from the processor and send the cache line to at least one of a plurality of processors in the shared memory multiple processor computer system to update the at least one of a plurality of processors (page 2, paragraph 25, lines 1-15).

As per claims 31-33, and 36-38 Ang teaches the claimed invention, but fails to teach wherein the cache purge instruction updates only one cache at a designated processor of the plurality of processors then marks a state of the cache line updated as exclusive at the designated processor and marks a state of the cache line as temporarily invalid at the processor executing the instruction.

Liu teaches a multiprocessor system wherein updated cache lines are transferred to another processor, where the first processor mark that specific cache line as temporarily invalid and second processor marks it as exclusive so after data used by second processor it will be return to the first processor (claim 2).

Therefore, it would have been obvious to one having ordinary skill in the art to modify the work of Ang because Liu teaches two different mark status for a cache line

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while been used by two different processors at the same time in order to prevent modification without first processor permission.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mehdi Namazi whose telephone number is 703-306-2758. The examiner can normally be reached on Monday-Friday 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mano Padmanabhan can be reached on 703-306-2903. The fax phone number for the organization where this application or proceeding is assigned is 703-746-7239.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-9600.

Mehdi Namazi
Examiner
Art Unit 2188

January 11, 2004

Mano Padmanabhan
1/12/04

MANO PADMANABHAN
SUPERVISORY PATENT EXAMINER
TC 2100